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Pesticide Fact Sheet Number 111
Calcium Arsenate

(U.S.) Environmental Protection Agency
Washington, DC

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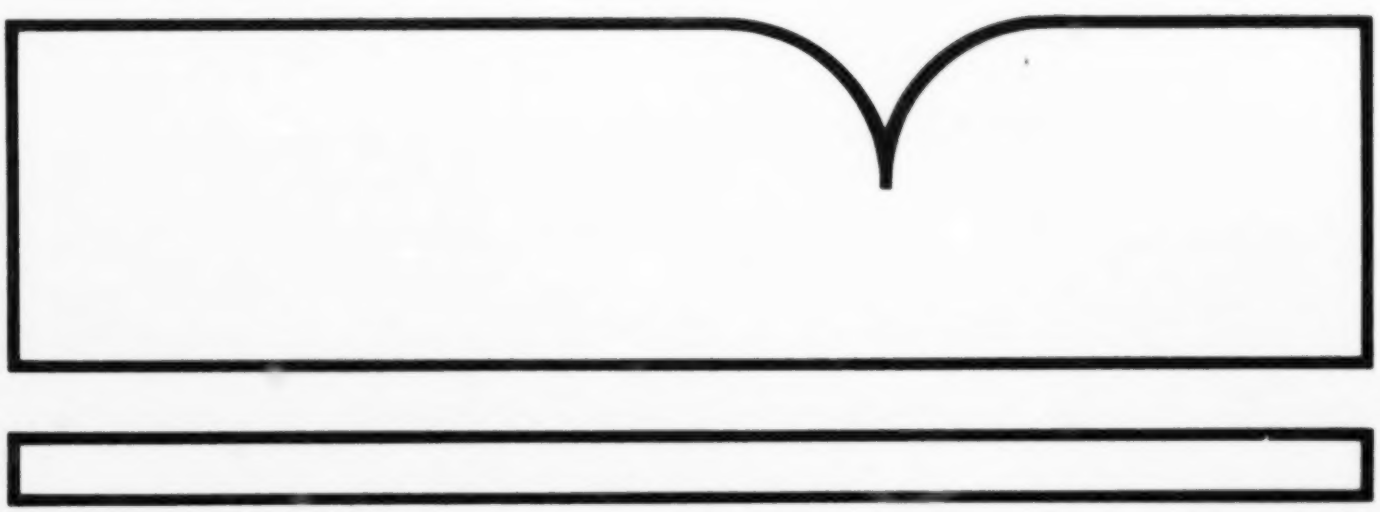

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This document contains u -date chemical information, including a summary of the Agency's regul- osition and rationale, on a specific pesticide or group of pestici Fact Sheet is issued after one of the following actions has occu.

1. Issuance or reissuance of a registration standard,
2. Issuance of each special review document,
3. Registration of a significantly changed use pattern,
4. Registration of a new chemical, or
5. An immediate need for information to resolve controversial issues relating to a specific chemical or use pattern.

17. Document Analysis a. Descriptors

Pesticides, regulations, Chemical Information Fact Sheet, Use Patterns, Science Findings

b. Identifiers/Open-Ended Terms

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Washington, DC 20460

EPA

Pesticide Fact Sheet

Name of Chemical: Calcium arsenate
Reason for Issuance: Special review
Date Issued: December 1986
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1. DESCRIPTION OF CHEMICAL

Common Name: Calcium Arsenate

Chemical Name: Calcium Orthoarsenate - $Ca_3(AsO_4)_2$

Trade Name: Turf-Cal

EPA Shaughnessy Code: 013501

Chemical Abstracts Service (CAS) Number: 7778-44-1

Year of Initial Registration:

Pesticide Type: Herbicide

Chemical Family: Inorganic Arsenicals

U.S. and Foreign Producers: Security Chemical Co.

2. USE PATTERNS AND FORMULATIONS

Calcium arsenate is currently used as a herbicide on 18% of U.S. golf courses for controlling Poa annua, crabgrass, and other annual grasses. It has also been used as a crop herbicide and an insecticide; however, these uses are considered to be inactive.

° Methods of Application: The flowable (liquid suspension) formulation is generally applied by ground boom. Products which are currently suspended include application by hand-held sprayer or broadcast spreader.

° Application Rates: Turf- 4.5 lb ai/A

Types of Formulations: The remaining active registered product is a flowable (liquid suspension). Products which are currently suspended include granular, wettable powder, and wettable powder/dust formulations.

3. SCIENCE FINDINGS

° Chemical Characteristics

Calcium arsenate is a pentavalent form of inorganic arsenic. It normally exists as a colorless amorphic powder with no discernible odor. Calcium arsenate contains 38% arsenic and is slightly soluble in water and soluble in dilute acids. The melting point of calcium arsenate is 1455°C , the density is 3.62 and the molecular weight is 398.08.

° Toxicological Characteristics

Inorganic arsenical compounds have been classified as Class A oncogens, demonstrating positive oncogenic effects based on sufficient human epidemiological evidence.

Inorganic arsenicals have been assayed for mutagenic activity in a variety of test systems ranging from bacterial cells to peripheral lymphocytes from humans exposed to arsenic. The weight of evidence indicates that inorganic arsenical compounds are mutagenic.

Evidence exists indicating that there is teratogenic and fetotoxic potential based on intravenous and intraperitoneal routes of exposure; however, evidence by the oral route is insufficient to confirm calcium arsenate's teratogenic and fetotoxic effects.

Inorganic arsenicals are known to be acutely toxic. The symptoms which follow oral exposure include severe gastro-intestinal damage resulting in vomiting and diarrhea, and general vascular collapse leading to shock, coma and death. Muscular cramps, facial edema, and cardiovascular reactions are also known to occur following oral exposure to arsenic.

° Environmental Characteristics: The environmental fate of calcium arsenate is not well documented. Studies to demonstrate its fate must take into account the fact that inorganic arsenicals are natural constituents of the soil, and that forms of inorganic arsenic may change depending on environmental conditions. Based on very limited data calcium arsenate is not predicted to leach significantly.

° Ecological Characteristics: Calcium arsenate is moderately toxic to birds, slightly toxic to fish and moderately toxic to aquatic invertebrate species.

° Metabolism: The metabolism of inorganic arsenic compounds in animals is well known. The pentavalent form, such as calcium arsenate, is metabolized by reduction into the trivalent form, followed by transformation into organic forms which are excreted within several days via the urine. All animals exhibit this metabolism except rats, which retain arsenic in their bodies for up to 90 days.

4. SUMMARY OF REGULATORY POSITION AND RATIONALE

The Agency is proposing to cancel all existing registrations of calcium arsenate, with the exception of the flowable formulation for use on turf. Measures to mitigate the inhalation risks including dust masks, respirators, which would be expected to reduce inhalation exposure by 80 and 90 percent, respectively, and restricting the use to certified applicators were considered by the Agency during the Special Review. The Agency has determined that these protective measures would not reduce risks to an acceptable level in light of the limited benefits. The Agency has further determined that the toxicological risks from all non-wood uses of calcium arsenate, except the aformentioned use on turf, outweigh the limited benefits. The flowable formulation for use on turf is being deferred pending further evaluation by EPA's Risk Assesment Forum of the carcinogenic potency of inorganic arsenic from dermal and dietary exposure.

° Benefits Analysis: No economic impact is expected as a result of cancellation of these uses. Viable alternatives are available.

5. CONTACT PERSON

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